Driver information system

Cross-reference to related Application

This application claims priority of German Patent Application DE 102 52 689.3, filed on November 13, 2002.

Background of the Invention

The present invention generally relates to a driver information system comprising an operating device having at least two operational control units and a holding unit for the operational control units, and a control device for validating control signals delivered by the operational control units.

Driver information systems of the afore-mentioned kind are well known and are now employed in a plurality of different vehicles. They do not only serve to display navigation information but have developed towards a central operational and control device by which a plurality of components in the vehicle may be controlled. The driver information system comprises a monitor on which relevant information as well as the option menus nec-

essary for operation are displayed. The operation itself is carried out in many cases by means of a central operational control unit which have many degrees of freedom. In one exemplary case the operational control unit is provided as a rotary-push button. In addition to this rotary-push button further operational control units like switches and the like are provided, particularly for allowing fast navigation within the selection menus.

The operational control units are generally located in the middle part of a dashboard between the driver and the co-driver so that the operational control units may be reached easily by the driver.

Although such a driver information system is already a reliable system, there is a demand for offering different design variations with respect to the driver information system, however, without causing higher costs for custom-made parts.

Summary of the Invention

In view of the above, it is an object of the present invention to fulfill this demand.

This object is solved by the driver information system of the afore-mentioned kind in that the operational control unit is freely configurable with respect to the holding unit.

This means with other words that the operating device is constructed of single independent operational control units, wherein these operational control units may be inserted within

the holding unit at different locations. The operational control unit is hence designed as a modular system so that the user may determine individually according to his own needs the arrangement of the single operational control units relative to each other. Moreover, this driver information system offers also the possibility due to its modular design to replace operational control units rapidly, for example because they are defect or because the user wants another type of operational control unit.

Beside the afore-mentioned advantages, the driver information system also offers the possibility that the user replaces a rotary push button e.g. with a cross-rocker-switch.

In a preferred embodiment, each of said operational control units comprises a transmitting unit, and said control device is associated with a receiving unit which receives the control signals supplied by the transmitting unit.

Providing each operational control unit with a transmitting unit, which receives the signals supplied by the control member, like a switch, a rotary push button etc., and processes them, makes it possible to encode the control signals according to a predefined protocol so that the control device may assign the received signals to one operational control unit. The best way for transmitting the control signals is to use a bus system which reduces the number of necessary lines to a minimum.

Preferably, the transmission of the control signals from the operational control unit to the receiving unit of the control device is carried out wirelessly, for example optically or by

radio frequency. In case of a radio frequency transmission, the standardized bluetooth-protocol would be an option and would offer the advantage that off the shelf operational control units may be used for its construction.

In a preferred embodiment the holding unit comprises a predetermined number of operational control unit-slots and unit-places, respectively, in which the operational control units may be inserted.

This measure makes the arrangement and mounting of the operational control units in the holding device much easier since respective mounting means may be provided at predetermined locations.

In a preferred embodiment each operational control unit comprises at least one frame connector which may be inserted in a respective edge-socket-connector mounted to each operational control unit-slot. The control signals may be transmitted on-wire via this connector-socket-connection.

Although this transmission on-wire of the control signals is disadvantageous compared with a wireless transmission, the on-wire transmission has significant advantages with respect to costs. The on-wire transmission is simpler and generally less susceptible to disturbances or interferences. An additional advantage is that the operational control unit is fixed in the holding unit by means of the connector socket connection. Further members for fixing or mounting the operational control unit are hence not necessary.

In a preferred embodiment each operational control unit comprises a mounting member which detachably engages with a mounting member provided at an operational control unit-slot.

This is a very simple possibility for the user to mount the operational control units. Of course it would also be possible to detachably connect the single operational control units, which are arranged side by side, with each other, so that only a few operational control units have to be mounted at the holding unit. This approach is particularly used when the operational units are hold slidably with respect to each other within the holding unit.

The operational control units may preferably be operating elements, volume control elements, hard key elements, keypad elements, etc. However it is to be noted that this enumeration is not exhaustive, rather further operational control units may also be used. The operating device of the present invention is flexible such that it also allows the integration of not yet used types of operating elements.

It is to be understood that the features mentioned above and those yet to be explained below can be used not only in the respective combinations indicated but also in other combinations or in isolation, without leaving the scope of the present invention.

Brief Description of the Drawings

Further features and advantages can be taken from the following description and the enclosed drawings. An embodiment of the

invention is shown in the drawings and will be explained in more detail in the description below with reference to same. In the drawings:

Fig. 1 shows a schematic plan view of an operating device, wherein different possibilities of control signal transmission are shown for example;

Fig. 2 shows a schematic sectional side view of the operating device of Fig. 1, and

Fig. 3 shows a schematic block diagram of a driver information system with an operating device.

Detailed Description of a preferred Embodiment

In Fig. 1 an operating device of a driver information system is schematically shown and indicated with reference numeral 10. The operating device 10 comprises a rack 12 being provided on its upper side (which is shown in Fig. 1) with a number of square openings or slots 14. The openings 14 are arranged like a chessboard having in total nine openings 14 in the present embodiment. This number is, however, chosen just as an example and may of course be greater or smaller. In the embodiment shown in Fig. 1, the nine openings 14 are evenly arranged in three columns and three rows, however, other arrangements of the openings 14 may be contemplated.

The rack 12 comprises as shown in Fig. 2 a main panel 16 which is spaced apart of the top surface 18. The main panel 16 is generally used to mount the rack 12 in the vehicle, normally in

a region of the dashboard (center console) between the driver seat and the co-driver seat. For this purpose recesses in the dashboard are provided so that the top surface 18 is flush mounted with respect to the surface of the dashboard.

The operating device 10 further comprises a predetermined number of operational control units 20.1 to 20.4 which are arranged in the openings 14. The openings 14 hence form receiving slots or places 22 for the operational control units 20. Consequently, the operating device 10 shown in Fig. 1 may receive nine operational control units 20 in total. Receiving slots 22 which do not contain operational control units 20 may be closed by cover plates. In Fig. 1, such a cover plate is exemplarily shown and indicated with reference numeral 58.

Each operational control unit 20 is self contained in a functional view and operates independent of the other operational control units.

One operational control unit 20 comprises a cover plate 24, an operational control 26 being mounted on the top surface of the cover plate 24, for example a rotary push button 28, a simple rotary switch 13, a keypad 32 or a switch 34, just as to mention some few operational controls.

On the bottom side of the cover plate 24 a control circuit 41 is mounted, as shown in Fig. 2, comprising different electronic components 43. The control circuit 41 is coupled with the operational control 26 and receives control signals corresponding to the operation of the operational control 26.

The cover plate 24 is dimensioned such that the opening 14 is entirely covered, the control circuit 41 with the electronic components on the bottom side of the cover plate 24 projecting into the opening 14; this may be clearly seen in Fig. 2.

In the present embodiment, the size of the cover plate 24 has been selected such that cover plates of adjacent operational control units 20 are right next to each other so that a gap between the cover plates is as small as possible. Preferably, gaps between the cover plates are avoided.

The operational control units 20 may be mounted on the rack 12 in different ways. In Fig. 1, three possibilities of mounting are shown just by way of example. However, it is appreciated that the way of mounting is homogenous within an operating device, that is only one type of mounting the operational control units of an operating device is used.

In the upper row, the cover plates 24 comprise in each corner a bore 46, which serves to receive screws engaging in respective threaded holes 48 in the rack.

Of course, the screws may be replaced with pins formed on the bottom side of the cover plate 24. The pins may be inserted into the bores 48 in the rack 12 and may be locked therein.

In Fig. 1, the operational control units in the center row are mounted on the rack 12 by using a plug connection, an edge-socket-connector 50 being provided on at least two opposing sides of the opening 14. Adapted to this edge-socket-connector 50, a pin connector is provided on the bottom side of the cover

plate 24, the pin connector being referenced in Fig. 2 with reference numeral 52. This pin connector 52 fits into the edge-socket-connector 50 and serves to fix the cover plate on the rack 12 by respective sizing the holding force of the edge-socket-connector.

A third possibility of mounting is shown in Fig. 1 in the lower row. Here, snap-in members 54 are provided on opposing sides of the opening 14. The snap-in members 54 may be locked in respective snap-in counterparts provided on the bottom side of the cover plate 24.

As already mentioned before the described three possibilities are mere exemplary and may therefore not be considered as exhaustive.

As generally be known, the operating device 10 is used to control a driver information system by selecting functions and by inputting any values. For this purpose the operational controls of the operational control units 20 are provided.

In order to transmit the control signals generated by the respective operational controls to the central control device, three possibilities are shown in Fig. 1 just as an example.

The first possibility is shown in the first row and is to transmit the control signal via radio frequency, preferably according to the bluetooth protocol, to a remote receiver which is coupled with a central control unit. The transmitter unit for this wireless transmission of the control signals is part of the control circuit 41 of an operational control unit, the

receiving unit preferably being provided within the rack 12 of the operating device 10 in order to particularly keep the requested transmission power as low as possible.

The approach shown in the second row in Fig. 1 is based on an on-wire transmission and is achieved by the plug connection of the operational control unit 20 and the edge-socket-connector 15. Electrical connections are made via this plug connection which allows the transmission of control signals to the central control unit.

Finally, an example of an optical transmission of control signals is shown in Fig. 1. An optical receiving element 56, for example a phototransistor, is provided below each opening 14. As a counterpart, an optical transmission element, for example an infrared LED, is provided on the bottom side of each cover plate 24, the infrared LED transmitting downwardly to the receiving element 56.

In Fig. 3 a simplified block diagram of a driver information system is shown and indicated with reference numeral 16. One part of this driver information system is the already described operating device 10. Further, the driver information system comprises a central control unit 62 which serves to control different components in a vehicle, for example audio components, navigation components etc. For displaying selection menus and other information a monitor 66 is provided in the dashboard, the monitor 66 being driven by the control device 62.

As already mentioned, the transmission of control signals from the different operational control units 20 may be achieved in different ways. In the block diagram of Fig. 3, the optical transmission is shown which uses IR-LEDs 58 and phototransistors 56.

Since the operational control units 20 may be placed in any receiving slot 22, each control signal is accompanied by specific identification information which allows the identification of the control signal. The control device 62 may therefore assign the control signals to the respective transmitting operational control unit 20.

The operating device 10 according to the present invention therefore offers the possibility to place the different operational control units 20 adapted to the individual requirements in any receiving slot 22.

What is claimed, is: